

STACKED-PLATE GAS-EXPANSION COOLER ASSEMBLY,
FABRICATION METHOD, AND USE

ABSTRACT OF THE DISCLOSURE

A gas-expansion cooler assembly has an expansion structure with an
5 expansion orifice and an expansion reservoir in fluid-flow communication with
an expansion-orifice outlet. A heat exchanger has a heat-exchanger inlet, and a
heat-exchanger outlet in fluid-flow communication with the expansion-orifice
inlet. The heat exchanger includes at least two heat-exchanger plates stacked in
a facing relationship along an assembly axis. Each heat-exchanger plate includes
10 an in-plane channel lying substantially in a plane perpendicular to the assembly
axis. The in-plane channels of the adjacent heat-exchanger plates are in fluid-flow
communication with each other and with the expansion-orifice inlet to form a
continuous high-pressure fluid-flow path from the heat-exchanger inlet to the
expansion-orifice inlet. The heat exchanger further includes an axial channel
15 extending parallel to the assembly axis. The axial channels in the adjacent heat-
exchanger plates are in fluid-flow communication with each other and with the
expansion reservoir to form a continuous exhaust fluid-flow path from the
expansion reservoir to an exhaust port.